

# Experiment Details including Antenna Parameters

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## Experiment Overview

The purpose of the experiments are to flight test a new radar system prototype under development for DARPA. These will be individual test events over a 6 month period, as opposed to continuous operation. We will produce and test two prototype systems, each with a phased array antenna. For all computations we consider the highest desired bandwidth and ERP of the systems.

## Antenna Parameters:

The antenna is an electronically steered directional rectangular antenna with a 3dB azimuth beamwidth of 2.4 degrees and a 3dB elevation beamwidth of 10 degrees using the full array. In certain configurations we may have a wider beam, but the ERP will be reduced as a result.

## Power Parameters:

The radar transmits with a 10.5% duty cycle with pulses no longer than 100 microseconds. The peak transmit power is 1135 Watts. With the 10.5% duty cycle, the average transmit power is 120 Watts. The antenna transmit gain is 31.34 dB, or a factor of 1361. So the peak ERP is  $1135 * 1361 = 1.55$  MW. The average ERP is  $120 * 1360 = 163$  kW.

## Operations / Flight Routes:

Flights are currently planned for Lawrence, MA (KWLM) and North Texas Regional Airport (KGYI), but we anticipate similar experiments at Ypsilanti, MI and Hunstville, AL. A nominal flight altitude of 8500 ft is planned but could vary from 6,000 ft to 9,000 ft depending on weather conditions and VMC minimum requirements.